EME DXpeditions of the M&M team:
to MI: the first ever 5-Band DXpedition
to OH0: the „in between“ DXpedition
to R2: our most exciting challenge

Dr. Monika Kohla
(logistics manager)
Dr. Michael Kohla
(responsible for the technical aspects)

History of our DXpeditions

- 2005: our first EME DXpedition with the dish to Ireland (EI/DL1YMK), only 23 cm
- 2006: Madeira (CT3/DL1YMK), 23 and 70 cm
- 2007: Iceland (TF/DL1YMK), additionally 13 cm
- 2008: Uruguay (CX/DL1YMK) with 70, 23 and 13 cm (first time ever in South America)
- 2009: a five band DXpedition on 2m, 70, 23, 13 and 9 cm to Northern Ireland (MI/DL1YMK) and a „Quicky“ to Aland (OH0/DL1YMK), 4 bands
- 2010: R2/DL1YMK, only 70, 23 and 13 cm

The M&M Team

- The duties are strictly assigned:
- Monika: responsible for trip organisation and operation management (stabilisation of the dish during high winds, searching the moon, if we had lost it…..)
- Michael: development of the equipment (especially for consistent improvements!!) and operation during the DXpedition (changing the feeds, rebuilding the station again and again for the different bands)

Organisation and Management

- Applying for the licenses
- Searching for the perfect QTH: Michael`s wish list:
  - QTH with free take off to East, South and West
  - calm location, no winds
  - solid ground for the tripod, but not too hard to get the anchors into ground
  - strong electric mains supply for high power SSPA’s
  - nice, comfortable holiday home without any neighbours
- Organisation of the transport for the equipment and the transfer for us to the site
- Customs clearance

Organisation and Management

- Applying for the licenses
- Searching for the perfect QTH: Monika`s wish list:
  - interesting surroundings, a lot of things to see
  - preferably a house with fantastic view over the open sea
  - cacti (because this is my hobby!!)
  - moderate climate, not too warm
  - clean water, no bugs (this was not self understanding, hi)
  - nice, comfortable holiday home without any neighbours
- Organisation of the transport for the equipment and the transfer for us to the site
- Customs clearance

Organisation and Management

- Applying for the licenses
- Searching for the perfect QTH:

But

you can´t always

get

what you want……..

- Organisation of the transport for the equipment and the transfer for us to the site
- Customs clearance

MI/DL1YMK: Northern Ireland

- Applying for the license: easy, only one mail
- Searching for the perfect QTH: difficult as usual, if you have to search in the www with the help of Google Earth
  - I found a QTH with a seemingly free take off to East, over South and West, only a little hedge surrounding
  - no neighbours
  - with a fantastic view to the open Irish Sea
- Organisation of the transport for the equipment and the transfer for us: easy by car, a ferry from the Netherlands to UK, crossing the UK, a fast ferry to MI
- Customs clearing; not necessary, within EU

Our QTH: Seabreeze Cottage

very lonely, fantastic view over the sea, but very windy… (see name above!)

First problems arising...

- At arrival we recognized, the QTH was far from ideal - that there wasn't any place for the dish, as there was a wall of high shrubs around the house – the shelter against the wind
- Departure or compromise??
- We decided to take the compromise and assembled the tripod in the dark on the parking lot of the house, knowing, that our window to the East will be very limited

Dish besides the house corner

The hedge was more than 2 m high, because the photos in www were old (we cut it a little bit….)

Pointing VK3UM

The dish was partly obstruc-ted by the house at moon-rise

Tied down tripod

From the first day on we had terrible winds and had to secure the dish additionally

The helping hand

During 9 cm operation I tried to stabilise the dish against the wind

OH0/DL1YMK: Aland-Islands

- Applying for the license: we were not sure, where to apply, because the Finnish Aland-Islands are independent in many respects, but it worked out by email
- Searching for the perfect QTH: nearly impossible, as the Islands are densely forested and very windy: as a compromise I booked a bungalow, surrounded by trees; this time we knew in beforehand that we would face some trouble with a suitable location for the dish
- Organisation of the transport for the equipment and the transfer for us: again by car, a ferry from Germany to Sweden, crossed Sweden (800 km), a second ferry to the Aland-Isles
- Customs clearing: no problem, as there was no…

Holiday log house in OH0

A little wooden bungalow in JP90sf between many trees

Nested dish, a trade-off…

As we had storm on the first days, we decided for some more sheltered location for the dish

Nested dish – pine tree obstructing VK3UM (again)

EAST

SOUTH

Very limited take off, but some-what safe…

R2/DL1YMK: Kaliningrad

- Applying for the license; huge problem, we needed 3 years from the first idea to all permits (details later)
- Searching for the perfect QTH: not really a choice, because after weeks of searching I found only one location besides several hotels: a farmhouse with a little hut in the garden, which the owner agreed to use as a shack and to set up the dish in the garden
- Organisation of the transport for the equipment and the transfer for us: by car; a ferry from Kiel over the Baltic Sea to Klaipeda, Lithuania, than heading south to R2
- Customs clearing: nearly impossible, according to professionals (details later)

Licensing problems I

- Kaliningrad was a former restricted military zone belonging to Russia - so it was hard to find the right starting point
- With the kind support of our Russian friends Sergej, RW3BP, and Dmitri, RA3AQ, we started the licensing process at the General Radio Frequency Centre (GRFC) at Moscow
- After months of no reaction I asked the German embassy in Moscow for help – and they responded! They found out, that indeed our matter was still processed by the GRFC – and it seemingly looked good
- Weeks later we got a letter from the GRFC with a payment order for an “expert finding”. It had to be balanced within a fortnight, otherwise the case would be dropped – so I did as requested, but again no reaction for weeks

Licensing problems II

- So I tried a fax number, which I found in the letter and from this day on we communicated by fax; I managed to get a copy of the license!
- Reading the fax-license (with the special event callsign) I was horrified, because they told us that we now had to undergo the ‘usual’ licensing procedure at the ROSKOMNADZOR in Kaliningrad – never heard about it before and didn’t find anything in the web
- So again with the help of the German embassy, this time the Kaliningrad branch, I got in contact with a lady named Larissa at the ROSKOMNADZOR, who was a real professional

Second license

- Applying for local license in Kaliningrad:
  - the lady sent the application form in Cyrillic, but explained, what they needed to know in English
  - we filled out in English, mailed it to her
  - she translated it in Cyrillic Russian and re-sent it to us
  - we printed it out, Michael signed it
  - I sent it back via UPS to Kaliningrad, as the time was running short and a surface mail letter took 3 weeks!
  - she immediately sent the 2nd license in beforehand by e-mail - for the customs procedure, as she explained...

Customs Clearance

- Meanwhile we had the license of the GRFC in our hands, but how to get realistic information about the customs clearance?
- A customs agent, whom I contacted weeks before, told me after an intensive examination of the case, we should forget about ham radio and rather spend holidays at the beaches of the Baltic Sea, we never would get the allowance to temporarily import the radio equipment…….

Customs Clearance

- Meanwhile w
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Customs Clearance II

- I again asked the German embassy and they provided me with the mail address of Alexander, a very clever local customs agent from Kaliningrad. He
  - needed a packing list – in Cyrillic (translation program was the key word)
  - drove to the checkpoint Nida, where we wanted to transit, with copies of our permits to talk to the local customs staff
  - got the final go: the customs were prepared and preconditioned for our arrival on the 12th of May around noontime
  - would be waiting for us on the Russian side of checkpoint Nida to assist
- We were ready 2 weeks before departure……

At the Destination: R2 - QTH

Dish in the strawberry fields: the farm ground was surrounded by a concrete wall, which later caused problems at low elevation of the moon

R2: Pointing VK3UM

As usual the dish is partly obstructed to the East, this time by a chicken shack…..It is a miracle that we are always able to work VK3UM, - Doug and Michael always have to be very quick at the key!

So far, I never did find the ideal QTH according Michael´s wish list……

Technical highlights

- Preloaded Stressed Dish: construction, characteristics
- Set Up on 9 cm
- Experiences with 13 and 23 cm with different SSPA´s and feed modifications from DXpedition to DXpedition
- Latest 70 cm feed
- Implementing the brand new OE5JFL stand-alone tracking system, supplied by Alex, HB9DRI

Dish components

This is our dish kit…..

…. so no real transport problems to any location in the world

The dish site in Kaliningrad

…. please note a very essential detail: a garden chair, the only thing we need for installing the dish and changing the feeds

The tripod in R2

The ground was first very wet and soft, so we needed our special support pads: 3 pieces of corrugated hard wood

The sustainable counterpoise for the dish: a bag filled with local stones

Rotator and central hub

The central hub consists of 2 solid plates, which are rotatable against each other, this enables us to fix the aluminum tubes and inserting the meshes at ground level

The rotator is a Spid RAS

Aluminum tubes, ropes and guy anchors

The aluminum tubes are inserted in the bore holes of the hub and stressed with guy wires made from Dyneema (HDPE, little elongation)

The ropes were fixed in front and at the back of the reflector with anchor pieces made on a lathe

The mesh panels I

The reflector is made from 18 wire-woven mesh segments, fixed to the tubes with florist binding wire

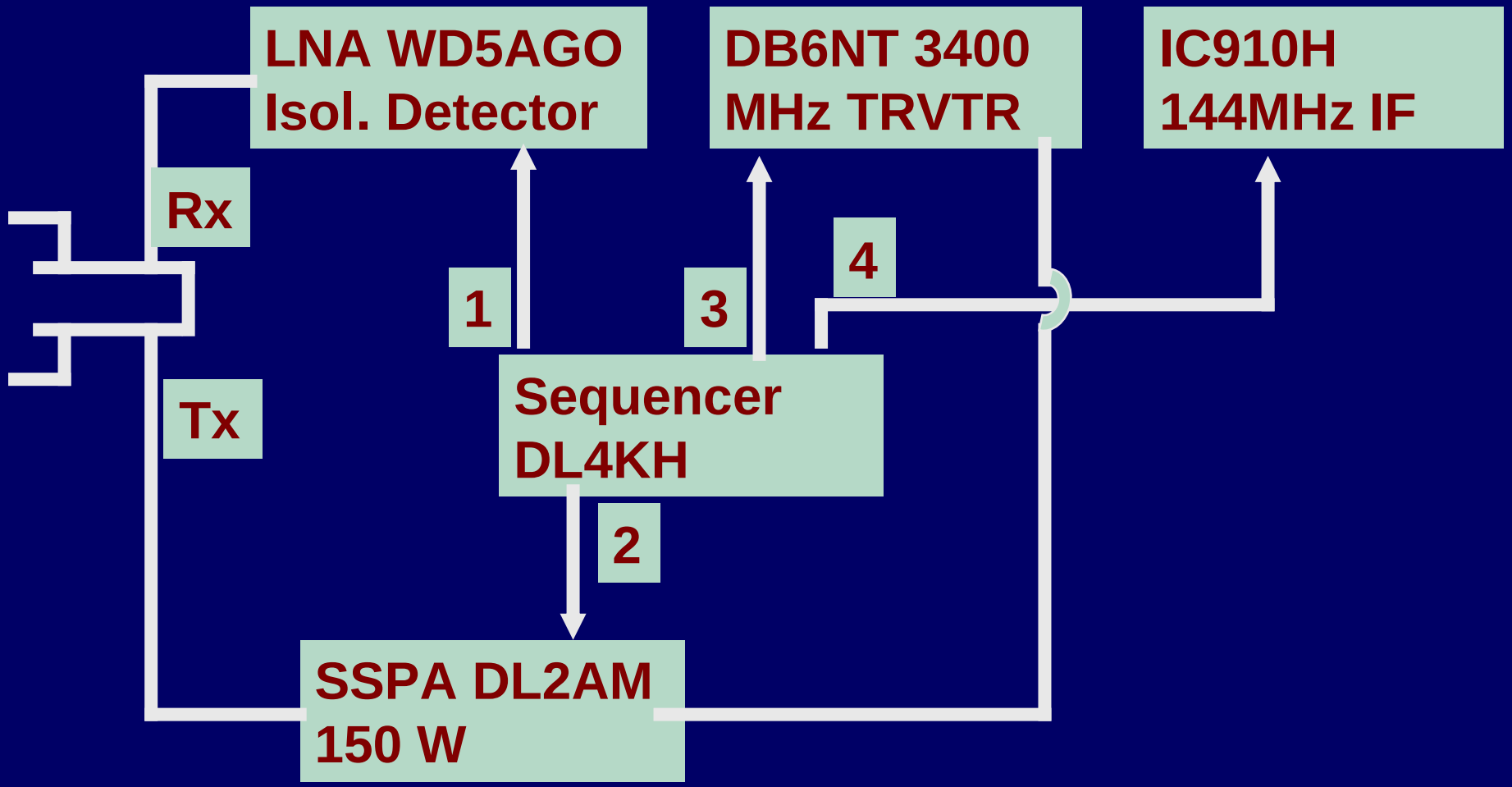
The mesh panels II

To protect the operators the sharp mesh edges are secured with duck tape

Cutting the florist wires after operation

Dish details: International Microwave Handbook

9 cm block diagram



The 9 cm station in MI

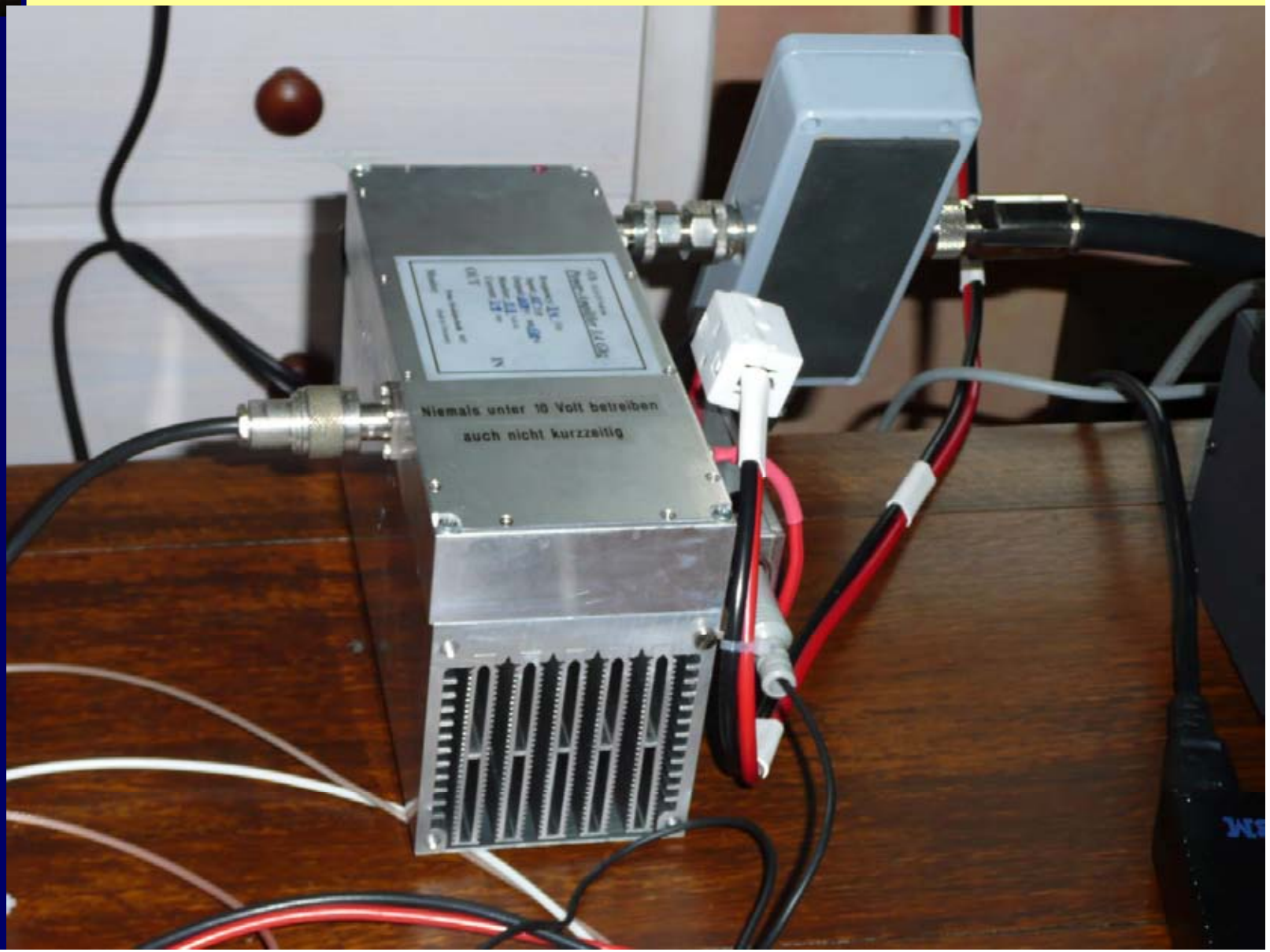
PA

Sequencer

9 cm GaAs-HPA

Note:

high efficiency forced air heat sink needed, DC input: 13.8 V at 32 A



9 cm power upgrade for OH0

- QRO was initiated, because the inaccuracy of a stressed dish gains influence on 3.4 GHz
- Moon tracking at low power was more complicated on 9 cm than on the other bands, echoes were comparatively weak
- LDMOS-SSPA was integrated in the set-up, 1 W in → 350 W out

Tiny little 9 cm septum feed

Home brew, dimen-sions based on RA3AQ dual mode feed

Dish on 9 cm at MI/DL1YMK

Extremly small beam width, very hard to find the moon, weak echoes (smiling after the first QSO, hi)

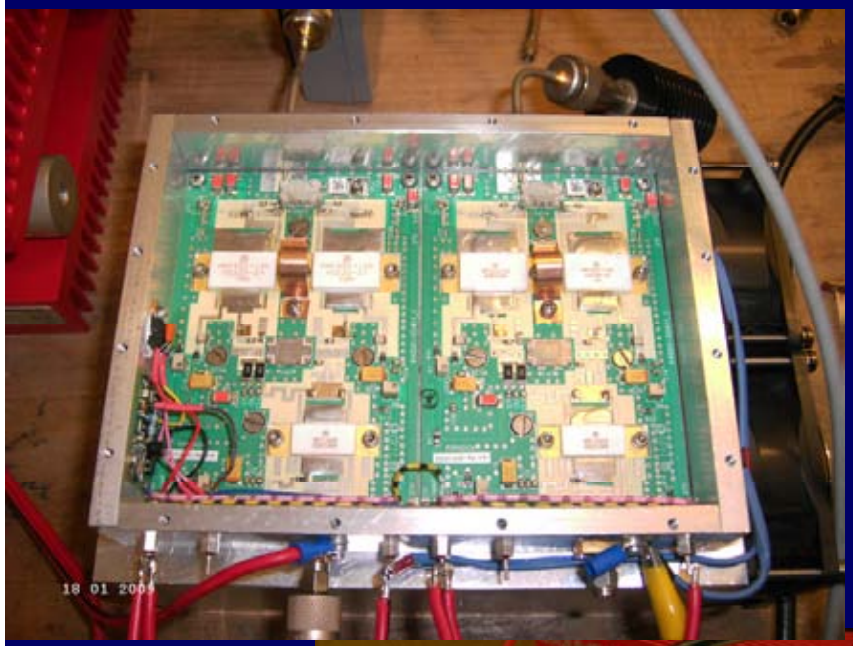
MI: Station behind the couch

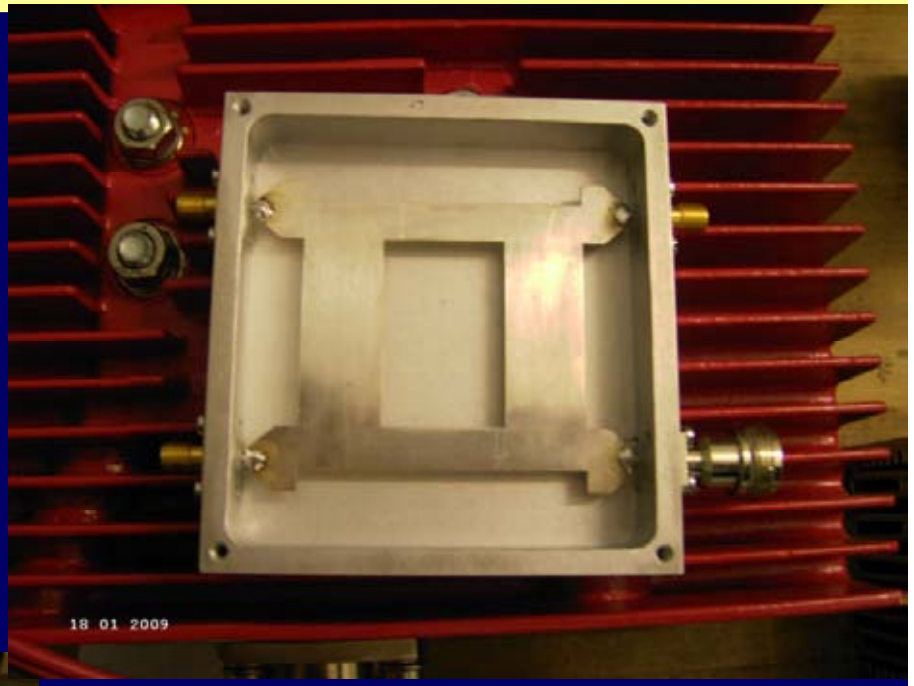
.. we had to move the furniture and re-arrange the room to find a place near the window...

The 13 cm station in MI

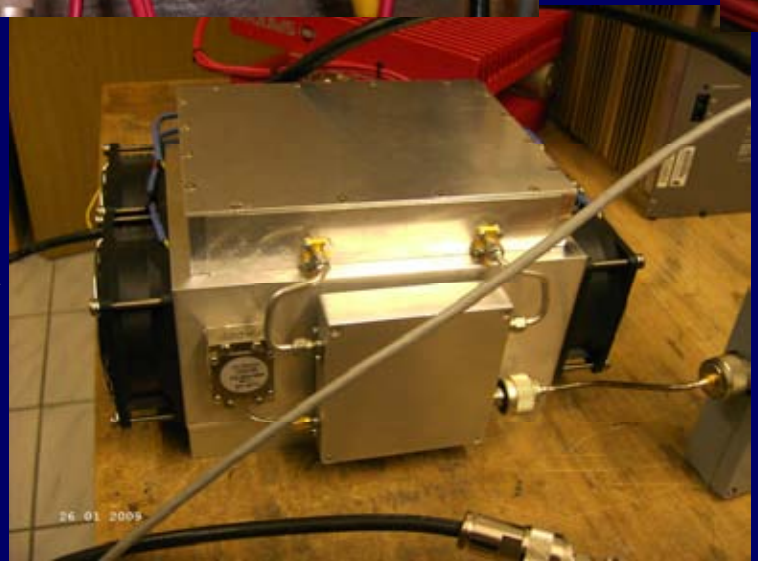
400 W LDMOS -HPA, made from 2 conver- ted CDMA amps

MI: The Surplus HPA for 13 cm





PA opened, 2 CDMA amp strips

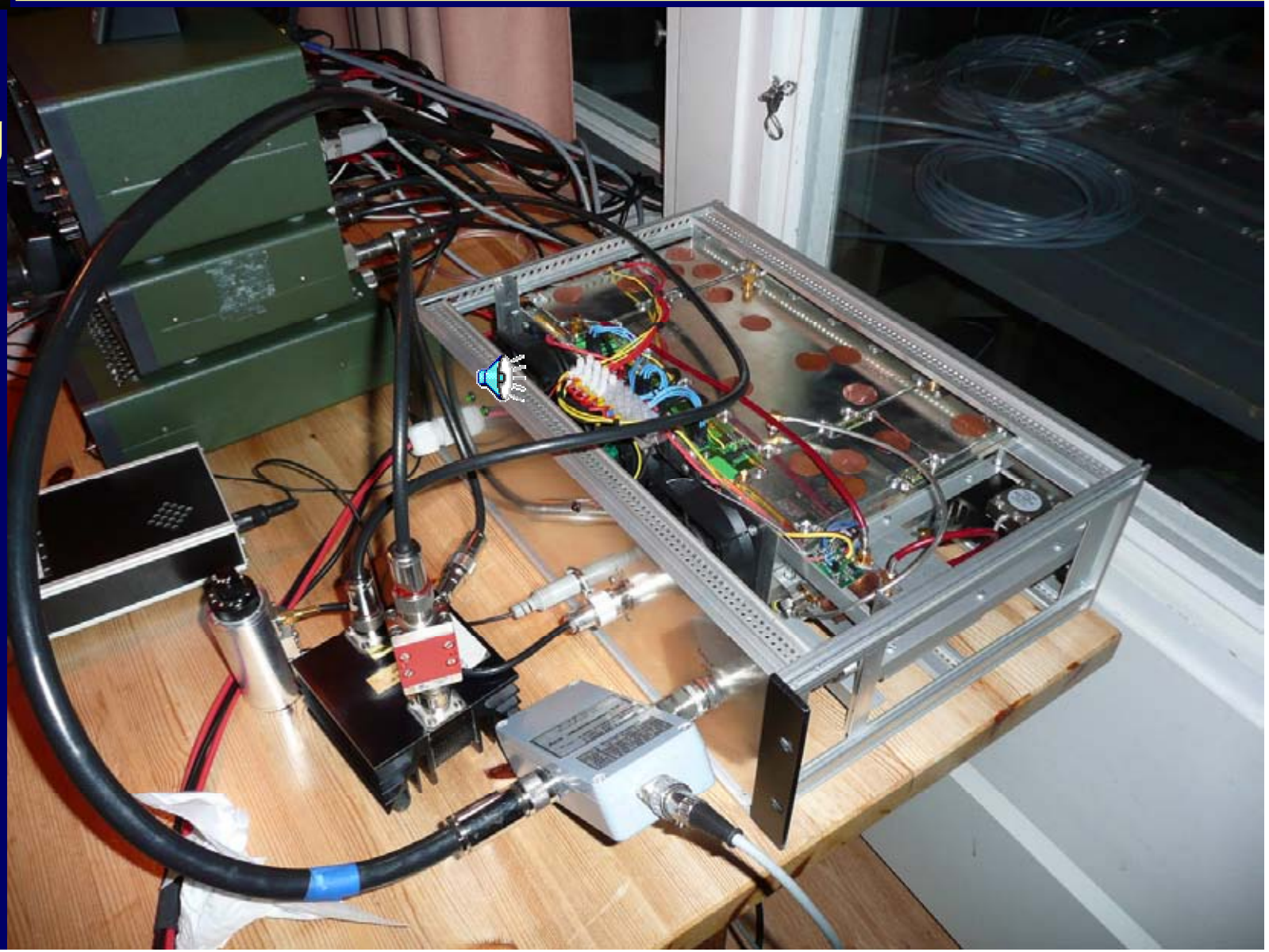


Homebrew 90° hybrid coupler, based on recalculated DJ9BV design

13 cm workhorse...

OH0 and R2: using new PA and home-brew combiner again

PA: 2x300W Ericsson, 4 mW → 600W



Kitchen shack in OH0

This time the station occupied the kitchen table

13 cm set-up active...

13 cm septum feed

MI: one day square septum solo

the next day square septum with flare (some improvement)

……first in OH0 and later in R2

New choke ring, the “pie in the sky” as proposed by G4DDK, which is the best option so far

Typical OH0-landscape

4500 Islands,

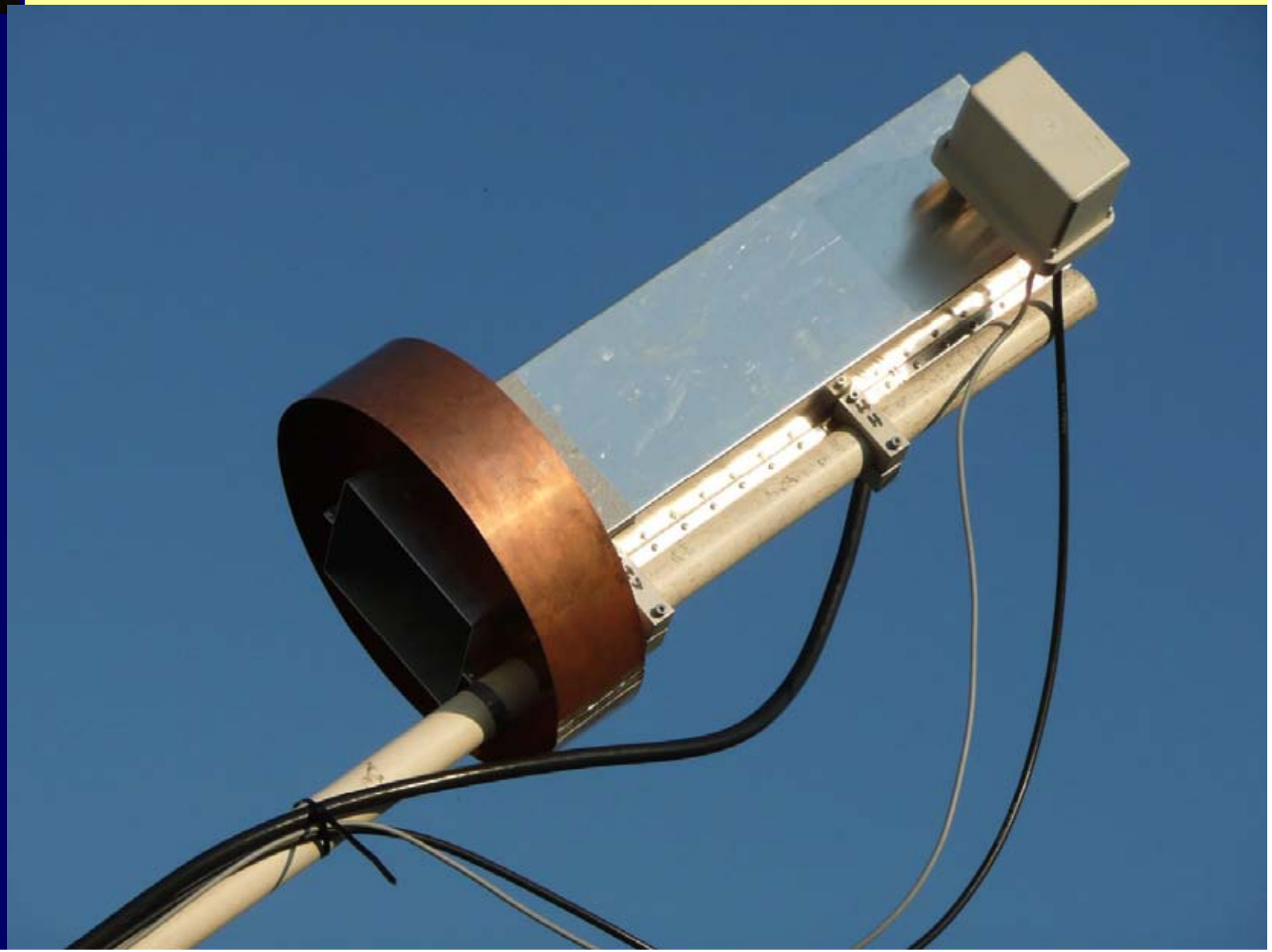
only 28000 inhabi-tants… means little chance for TVI/BCI

23 cm set up

Since our first EME DXpedition to Ireland the 23 cm PA made by DB6NT worked flawlessly. It uses four Infineon LDMOS devices PTF141501, each capable of 150 W sat.

Small diam. choke on 23 cm

Since MI the 23 cm feed has been added a choke made from copper, dimen-sions based on G4DDK's findings



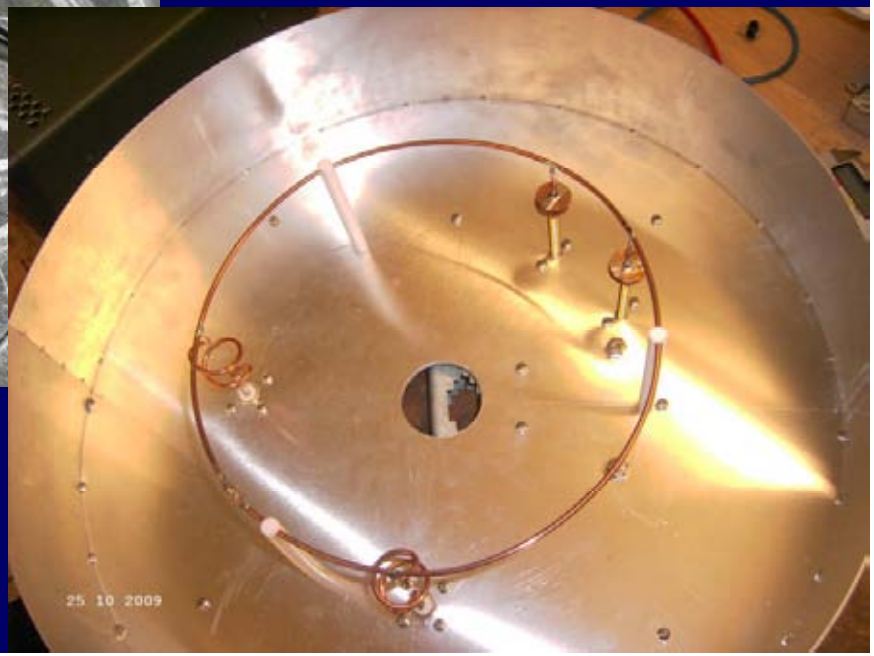
70 cm Set Up

MI: feed with H/V-switching, based on CT1DMK design

BEKO 1kW-PA on 70 cm, but B. Korte also loaned the 2m PA

OH0: next generation 70 cm feed

Based on CT1DMK and OK1DFC



H/V-switchable short backfire loop feed

R2: again a new feed....

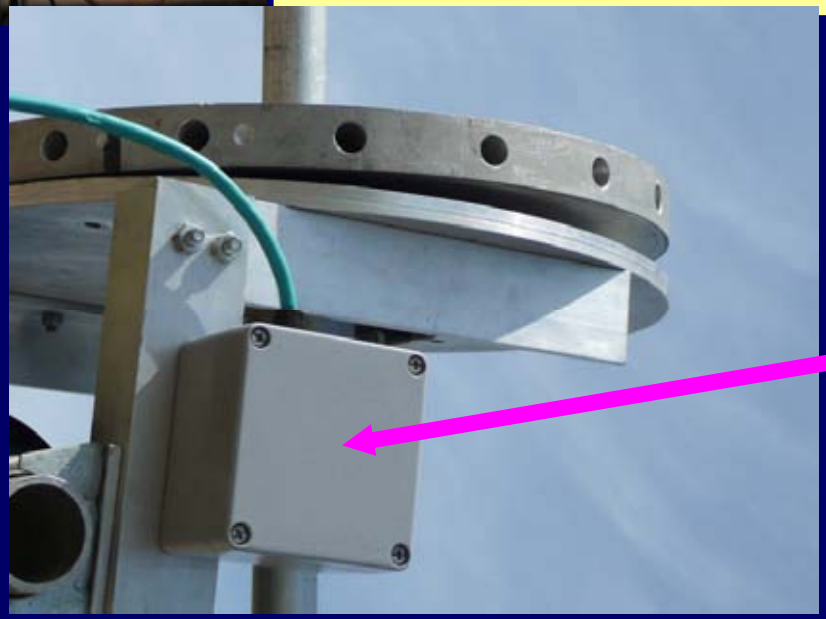
The new feed was the best so far, enabled us to hear our own echoes;

down-gauged to only linear pol., but saving 1 coax relay and coax harness

Station in R2 in the summer house

This was a very essential improvement for moon tracking, OE5JFL's superb generation 2 controller, the populated pcb's provided by Alex, HB9RDI

New absolute encoders

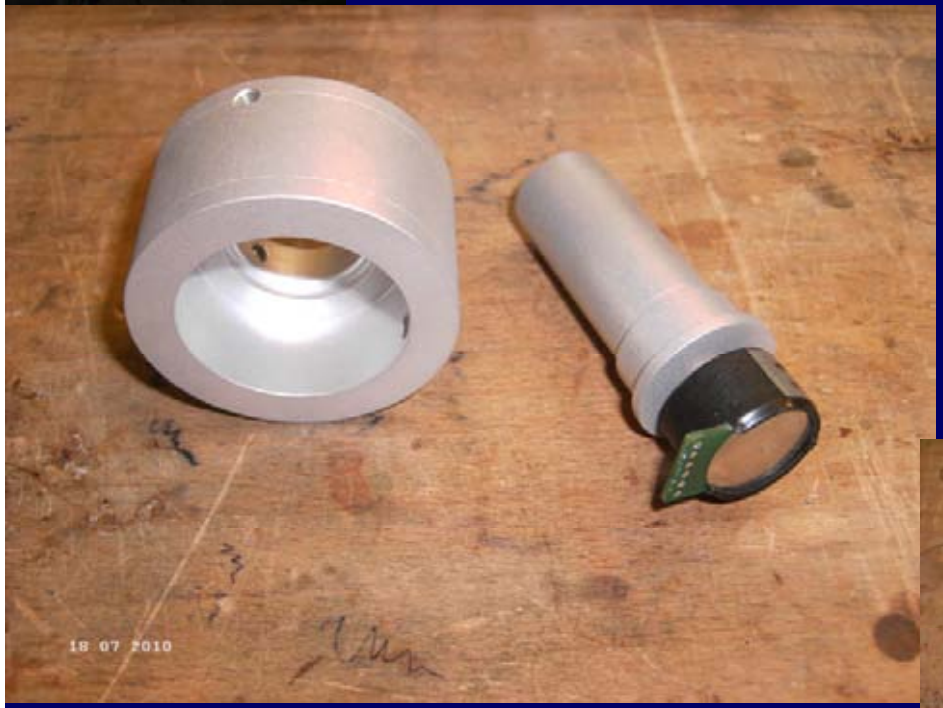


The Spid rotator had been upgraded by 12-bit magnetic absolute encoders, this upgrade nearly pushed the second OP close to unemployment benefit, hi!

Inside the SPID-RAS

As there is not space enough for the AZ encoder inside the rotator, a special collet was made on a lathe, which finds its place inside the mast support. A central flexible axis was inserted in the bore hole of the support, made from fibre-reinforced PVC-hose

Special collet for the absolute encoder



For easy assembling the collet is made of two aluminium parts

The joined parts with the flexible axis, ready to fit into the mast support of the rotator

The fifth band in MI: 2 m….just for fun

We dismantled the dish and used the tripod for a single yagi, only JT was possible

MI: The chaos in the living room...

For the last 3 DXpeditions all equip-ment was transported in staple-boxes, stuffed in Monika´s SUV

Transport problems….

The last challenge after completing the operation: putting all things back in the car...

Wandering sand dunes

Kaliningrad is very picturesque, we made many sightseeing trips to the surrounding areas and to the Kuronian Spit beaches

Technical features summary

Band	in MI	in OH0	in R2
70 cm	same as in CX	new feed with short backfire loop	new feed & Preamp
23 cm	corrugation ring	same as in MI	new tracking system
13 cm	square flare	corrugation ring, new PA 2x300W Ericsson	
9 cm	completely new, 150 W	350W LDMOS, OCXO G8ACE	no alloc.

Power supply, 28 V 2000 W SPS for all bands

Why: XXX/DL1YMK ??

- With a discussion in the European moon reflector early 2009 about what a real random QSO is all about, we decided to make a DXpedition to OH0 “in between”, without telling a word regarding the destination
- We made no skeds (except on 9cm), well facing the risk of reduced QSO numbers
- We asked all takers not to disclose, where we were – and all kept it secret….BIG fun
- Followed this principle also for the R2-operation

Summary

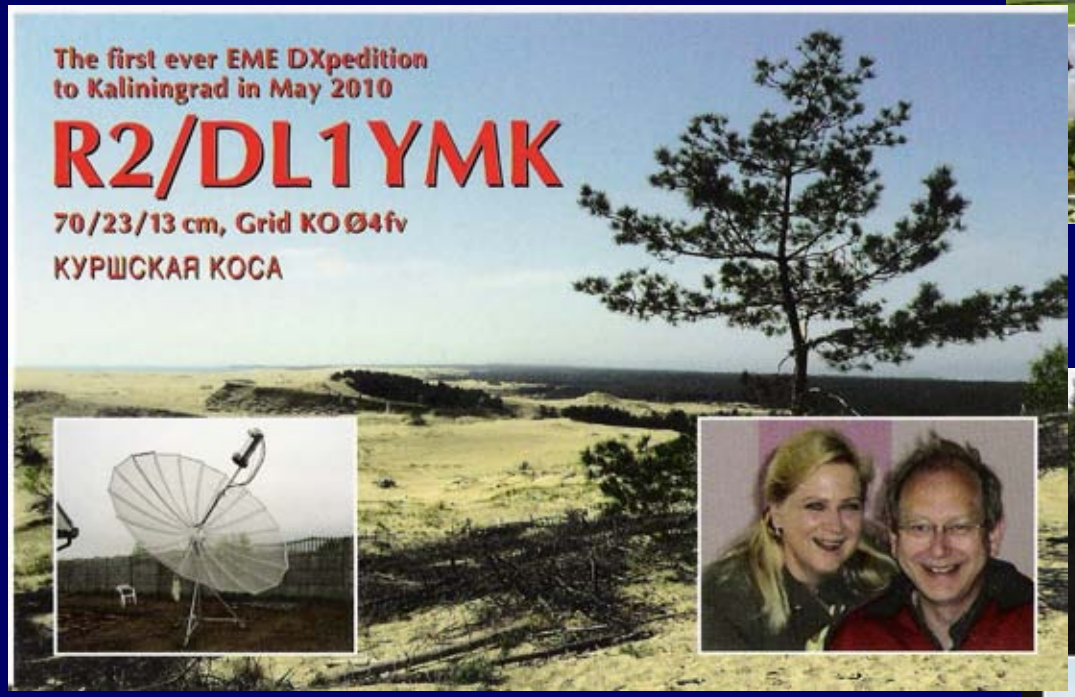
- Power-upgrading on 9 cm (improved echoes due to new PA) in OH0 and 13 cm (better results in shorter time due to new PA) were really worth the effort
- 23 cm gives fantastic results for 10 days activities; contests (DUBUS in MI and R2 and ARRL in OH0) during DXpedition, boosting activity and gives a lot of fun
- Even on 70 cm we are now able to hear our own echoes because of the simplified version of the feed used in R2 and the new DB6NT pre-amp
- The new tracking system was a real relief, because for the first time we never lost the moon in R2

Results MI, OH0 and R2

Band	QSO´s	Initials	DXCC´c
9 cm	MI: 10 OH0: 8	MI: 10 OH0: 8	MI: 8 OH0: 7
13 cm	MI: 27 OH0: 30 R2: 37	MI: 24 OH0: 27 R2: 28	MI: 16 OH0: 19 R2: 20
23 cm	MI: 111 OH0: 96 R2: 130	MI: 72 OH0: 67 R2: 79	MI: 36 OH0: 32 R2: 35
70 cm	MI: 21 OH0: 16 R2: 34	MI: 20 OH0: 13 R2: 31	MI: 16 OH0: 11 R2: 19
2 m, only MI	6	6	5

The last courtesy…

…of a QSO is a QSL-card



… and where do we go next??

….we are able to install an EME station on 4 bands at any location in the world within a day – see you from ????

Vy 73, M&M team

CU off the rock……..